FISHERY MARKET NEWS

FEBRUARY 1939

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FISHERY MARKET NEWS

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FISHERY MARKET NEWS

A REVIEW OF CONDITIONS AND TRENDS OF THE COMMERCIAL FISHERIES

February 1939 Washington, D. C. Vol. 1, No. 2

SUMMARY

Fresh Fish

New England.--December vessel landings were under those of a year ago due principally to smaller receipts at Gloucester. Mackerel landings in December were nearly three times those of the same month in 1937. December rosefish receipts were less than one-half those of December 1937. Total landings of fresh fish by vessels increased in 1938; however, most unit prices were down. New England halibut landings during 1938 were the smallest on record. Massachusetts sea scallop industry continues to grow, especially at New Bedford.

Rhode Island.--Otter-trawl fishery decreases in 1938. The 1938 lobster catch was reported at about one-half that of the preceding year and prices were down. Oysters were good in quality but prices low in 1938. Supplies of soft clams were good in 1938 and prices fair, but the closing of some waters due to pollution restricted the catch.

New York.--Striped bass catch was reported to be up 50 percent in 1938, with prices good. There were decreased catches of bluefish. Mackerel catches continued into the winter. Whiting were plentiful in 1938, with prices low. There was a good shad run in the spring of 1938, but they were mostly small and prices low. The hurricane during the fall of 1938 destroyed much gear on Long Island and resulted in decreased yield of many species.

New Jersey.--Catch by purse seines, otter trawls, and lines were reported to have decreased appreciably in 1938. Oysters were abundant in the fall of 1938, with prices low.

Pacific Coast.--Agreement between vessel owners and fish exchange at Seattle resulted in "cod" fleet sailing in January after lay-up of about two months.

Frozen Fish

Domestic holdings of mackerel in January were 48 percent over a year ago while holdings of rosefish fillets were down 67 percent. Total holdings in South Central section were nearly three times those of a year ago. Over one-half of the Boston holdings are fillets. Shrimp is the leading species stored in New York City and Chicago.

Canned Fish

Unsold canned salmon stocks at the end of December were 31 percent under last year. Unsold stocks of Maine sardines are small. California sardine and mackerel packs exceed those of previous year but the tuna pack shows a decrease.

Byproducts

Marine-animal oil production decreased in 1938, with pilchard oil contributing about one-half of the total yield.

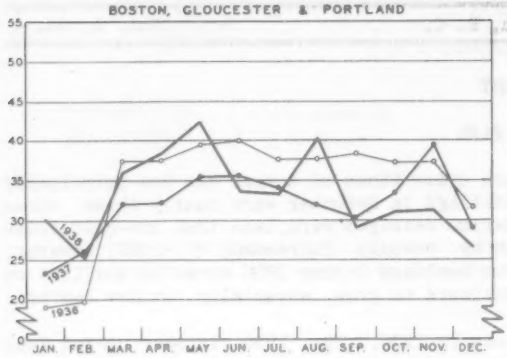
Foreign Trade

December exports of total fishery commodities changes but little from a year ago. Imports during December were under December 1937, this decrease being reflected especially in salted groundfish and herring. Nearly one-fifth of imports were fresh-water fish and eels.

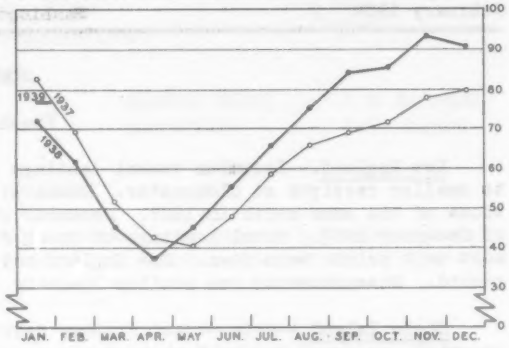
TRENDS OF FISHERY TRADE

In millions of pounds.

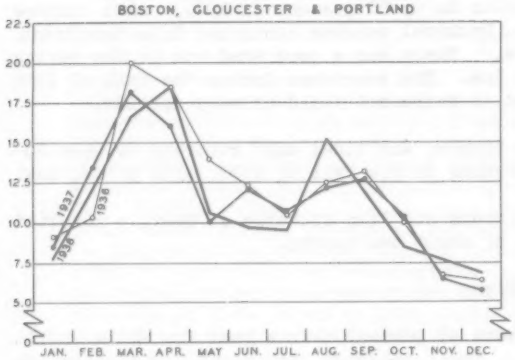
VESSEL LANDINGS, ALL FRESH FISH
BOSTON, GLOUCESTER & PORTLAND



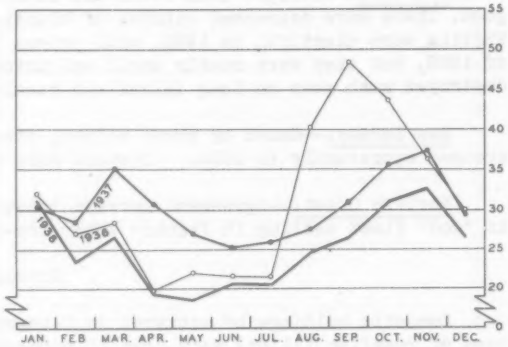
DOMESTIC COLD-STORAGE HOLDINGS OF FROZEN FISH



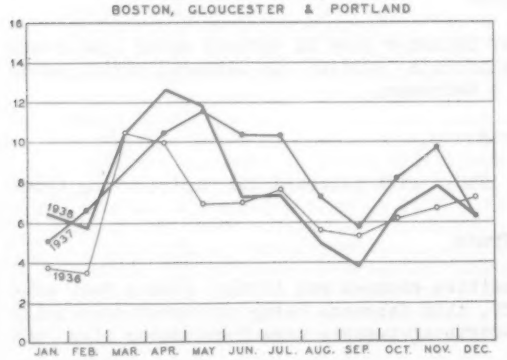
VESSEL LANDINGS, FRESH HADDOCK
BOSTON, GLOUCESTER & PORTLAND



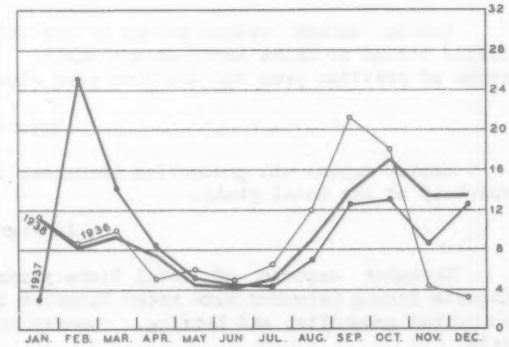
IMPORTS OF EDIBLE FISHERY COMMODITIES



VESSEL LANDINGS, FRESH COD
BOSTON, GLOUCESTER & PORTLAND



EXPORTS OF EDIBLE FISHERY COMMODITIES



SUGGESTIONS FOR STORING FROZEN FISH

By J. M. Lemon, Technologist

U. S. Bureau of Fisheries

Within the past few years the variety and quantity of frozen foods available to the consuming public has increased to a considerable extent. This has likewise led to an increase in newly encountered problems of handling by those serving perishable foods to the public. While specific regulations or rules for handling frozen foods are not available, there are a few general principles which cannot be overlooked if it is desired to render the highest class service to the consumer of these products.

In the conduct of studies or investigations dealing with frozen foods as a class, it is impossible to entirely separate one group of foods from another, since there are certain interrelated factors which cannot be overlooked. While the investigations conducted by the Bureau of Fisheries are primarily confined to fishery products, they bear a definite relation to all other groups falling within this broad classification. If one frozen food falls below another in high standard of quality, not only is the single group affected in consumer appeal, but all those in the class may be adversely affected.

Fish, not including shellfish, may be placed into two broad groups when classified according to the composition of the flesh. The first of these contains those fish which store their oil or fat in their livers, and for this reason are generally referred to as the non-oily variety. Examples of this group are cod, halibut, and haddock. The other group contains those fish which store their oil in the tissue throughout the body and are termed the oily or fatty fish. Representative species of this group are salmon, mackerel and herring. The percentage composition of the oil in the flesh varies considerably within these two classifications; however, the flesh of the non-oily fish contains less than three percent fat, while those placed in the oily class contain considerably more than three percent. If the shellfish were classified according to the fat content, they would be placed in the non-oily group. This classification of fish is mentioned since the type of spoilage is, within certain limits, dependent upon the type of fish.

In any discussion of the methods of handling frozen fish, it is necessary to consider to some extent the changes which occur naturally and which cause deterioration of both the fresh and the frozen fish. There are three primary types of spoilage which are responsible for the deterioration: First, the action of bacteria with which the seafood becomes contaminated from handling after removal from the water; second, the oxidation of the oil composing a portion of the tissue of the flesh; third, the action of substances contained within the tissue, which are known as enzymes.

When fish are frozen and stored at a low temperature the action of the bacteria is almost entirely arrested, and for all practical considerations, this type of spoilage is eliminated. There remains then the oxidation of the oil and the action of the enzymes contained in the flesh during long periods of storage.

The second type of spoilage is the oxidation of the oil or fat contained in the flesh of the fish, which imparts a rancid odor and flavor. In instances where the fish are of the oily variety and are stored frozen over a considerable period of time, this spoilage is often of serious consequences. It is not possible to state with any degree of accuracy the length of time that fish are held in cold storage before being marketed. Some of the oily species are stored over considerably longer periods than others, and only those which are held over periods exceeding six months are likely to show indications of deterioration from the oxidation of oil. Where the fish are properly glazed with a coating of ice, or covered with one of several moisture-proof wrappings, this reaction between the oxygen of the air and the oil is reduced to a minimum and is not a factor over which to be greatly concerned.

The enzymes are substances contained in the flesh of the fish which build up and tear down the tissues during the life processes. These reactions are common to all forms of animal life and are automatically controlled so long as the animal is alive. Upon death the enzymes which build the tissue are inhibited and only those which tear down the tissue

remain active. The temperature at which the tissue is stored has a definite effect upon the rate or speed of this reaction. In fish which are stored at a temperature of 30° F. the rate of the reactions is much greater than in those which are frozen and stored at 0° F. or below. This accounts for the value of freezing as a method of preserving foods for future use. While the action of these enzymes will eventually cause complete spoilage of any animal tissue as a food, they cannot be considered entirely detrimental since the process of "ripening" is necessary for meats derived from warm-blooded animals. This "ripening" is the result of enzymatic action and is not necessary nor desirable for fishery products since the texture and composition of the flesh are such that the flavor is available without ripening. There is no method known at present for the prevention of the enzyme action; however, it can be greatly reduced by low temperatures. It is considered advisable to freeze and store fish at as low a temperature as is economically possible. This varies between 0° and 10° above zero F.

"Quick-freezing" has never been defined--there are a great variety of ideas as to just what constitutes a quick-frozen product. Each firm is apt to refer to its own method as "quick-freezing" regardless of the conditions under which the results are accomplished. In general, the term "quick-freezing" can only be defined relatively until the rate at which freezing proceeds through the tissue has been accurately determined. It is generally conceded that fish frozen at the low temperatures are superior to those frozen at higher temperatures.

There is one universally recognized axiom in connection with handling frozen fish. The temperature of the storage room should be held quite constant, and not be allowed to fluctuate over a wide range. A wide fluctuation permits an increase in the size of the ice crystals within the tissues and thus damages the texture and hastens spoilage of the flesh. Another well-recognized rule which cannot be overemphasized is that fish which have been frozen should not be allowed to defrost until immediately before cooking. The increase in temperature speeds up the enzyme action and causes a gradual breakdown of the tissue.

It is almost impossible to state all of the points to be observed when selecting frozen fish for quality. The purchaser is dependent more upon the reputation of the firm packing the fish than he is upon his own judgment. In the light of our present knowledge relative to all frozen products, the majority of the firms preparing frozen fish should exercise greater care in the selection of the stock, methods of processing, and storage conditions and handling before the fish reach the consumer.

In selecting frozen stock, the purchaser should assure himself, so far as possible, that it has been kept in proper frozen condition since it was originally so treated. It should be examined carefully to see that all cut surfaces retain their waxy appearance, and that the surface coating, either wrapper or ice glaze, has not been broken. The skin surfaces should not show any great degree of discoloration which indicates a drying effect resulting from inferior cold storage. If the fish under examination is in the round, the eyes should not be sunken into the head. There should be no odor of ammonia from the gills or body cavity. After some experience it will be possible to judge the quality of the frozen stock quite accurately.

Summary

Fish which are frozen for future markets should be carefully selected. Only those in prime condition should be handled.

The fish should be frozen when received at the cold storage plant and be held in this condition until finally delivered into the hands of the consumer.

In instances where, for any reason, the fish have defrosted en route, immediate disposition should be made of them. Under no circumstances should attempts be made to refreeze them.

The temperature of the cold storage room should be maintained at between 0° and 10° above zero F., using great care to limit the range to as narrow a margin as is possible. It is advisable to control the temperature with a thermostat.

Boxes or cartons containing frozen fish should be piled in the storage room so that the air can circulate with considerable freedom between them. This prevents heating and defrosting of those in the center of a tight pile. Care should be exercised in stacking the piles well away from the walls, if the storage room has an outside wall or is near a room maintained at a higher temperature.

A heavy glaze of ice should coat the surface of all fish frozen in the round or which do not have a wrapping of some moisture and vapor-proof material. Frequent examination of the glaze should be made and reglazing done as is necessary to prevent an exposure of the surface. The water used for reglazing should be near freezing temperature when sprayed upon the surface of the fish.

When refrigerator cars are to be loaded with fish taken from a cold storage room, it is advisable to thoroughly precool them before the loading is begun. When the temperature of the cars has reached approximately that of the storage room, the loading should be accomplished as rapidly as possible. When a car is received at the warehouse and opened, it should be completely unloaded with as little delay as possible.

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MARKET FOR OYSTERS IN THE UNITED KINGDOM

The Commercial Intelligence Journal, issued by the Department of Trade and Commerce at Ottawa, Canada, included in the issue for January 21, 1939, a report on the marketing of oysters in the United Kingdom. The present study revises and brings up to date an article entitled "Oysters in the London Market", published in the same journal on January 9, 1937. The report includes the information that at least 95 percent of the oysters consumed in the United Kingdom are imported. In this connection it is most interesting to observe that there were consistently increasing imports of oysters for consumption into the United Kingdom throughout the period for which data were presented from 1932 to 1937; and, further, that the contributions of the United States to these imports increased annually. In 1937 the total imports of oysters for consumption amounted to about 63,000 bushels, of which the United States accounted for nearly three-fourths. The principal other countries of source were the Netherlands and France.

In addition to oysters imported for consumption, there have been increasing receipts from foreign countries for "re-laying" and breeding. Oysters imported for re-laying may be planted for the purposes of fattening and conditioning or as a storage expedient, while those imported for breeding are intended for the rebuilding of English oyster beds. The total imports during 1937 for re-laying or breeding amounted to 41,000,000 oysters in number, of which France alone contributed 87 percent. The United States followed with 8 percent.

While oysters native to the United Kingdom usually are preferred, prices for the most desired varieties are so high as to preclude their use except by the wealthier classes. Among the native varieties are Colchester oysters, which are much desired. They are found in creeks where the water is relatively fresh. The wholesale price in London for these oysters is about $15.90 per hundred. Whitstable oysters from the estuaries of the English coast also are highly regarded and command a wholesale price of about $9.80 per hundred. Cornish oysters are noted for their "coppery" metallic taste and are obtained from the Cornish coast. They are available for about $4.20 per hundred.

Among the imported varieties, Brittany and Holland oysters are similar to the popular Whitstables. They are not considered equal to the native oysters but command fair prices, especially after re-laying. Brittany oysters sell at wholesale for about $4.70 per hundred and Holland oysters at $4.20 per hundred. Oysters imported from the United States are retailed throughout the year but principally in the summer months at seaside resorts. Supplies for this trade are imported during the spring months and re-layed for the purpose of storage until needed. The retailer pays about $2.10 per hundred for large oysters imported from the United States and $1.65 for the small size. Portuguese oysters are all relayed for conditioning. They sell at wholesale for about $1.30 per hundred.

Almost all oysters marketed in London are consumed on the half shell, their use in cocktails or soups, or fried, being little recognized. Thus the import demand is for oysters in the shell.

The only oyster production in Scotland is near Stranraer at the Loch Ryan fisheries. These oysters are said to equal the Whitstables in quality but are not sufficiently abundant to meet the Scottish demand. American oysters are reported to sell in Scotland at little more than half the price of Loch Ryans and Whitstables.

FISH AND SHELLFISH CANAPES AND HORS D'OEUVRES

To those of you who may have relished some of the many varieties of canapes and hors d'oeuvres prepared under the direction of Norman D. Jarvis, associate technologist of the Bureau, and served at the National Fisheries Convention and Exposition held last October at Boston, Mass., and to those of you who did not have that opportunity but who have taste for such tidbits, it may be of interest to know that Mr. Jarvis recently compiled an 8-page memorandum containing about 75 different recipes for canapes and hors d'oeuvres made from 17 different fishery products. The memorandum is referred to as Sp. 3219-A, and it may be obtained without cost from the Publications Office of the Bureau of Fisheries, Washington, D. C.

FISHERY ADVISORY COMMITTEE MEETS

The Fishery Advisory Committee for the Department of Commerce met in the Commerce Building in Washington on January 30 and 31. Persons representing the Fishery Industry from all sections of the United States attended, a total of 15 active members and one former member being present. Charles E. Jackson, Acting Commissioner of the Bureau, welcomed the group. Secretary of Commerce Harry L. Hopkins and Assistant Secretary Richard C. Patterson, Jr., later spoke to the group, assuring them of the active interest of the Department of Commerce in the solving of the Industry's problems.

The meeting included discussions of the major problems confronting the Industry and the Bureau and the adoption of a set of resolutions which should assist materially in helping the Bureau to approach many of these problems. A resolution was passed commending Commissioner Frank T. Bell for the many accomplishments of the Bureau under his administration and his active cooperation with the Committee.

One of the results of the deliberations of the Committee was the division of the Pacific Coast area into two regions, whereas only one existed before.

Mr. Gardner Poole of Boston, Mass., was selected to serve for another year as chairman of the Committee, and Charles W. Triggs of Chicago, Ill., was named vice chairman.

FRANCE REQUIRES SANITARY INSPECTION OF FISHERY PRODUCTS

From the American Consular office in Paris, France, comes an interesting news item regarding improvements in the inspection of fishery products. A recent decree requires that oysters and other shellfish not destined for immediate consumption are also subject to rigid sanitary inspection. This inspection is made by the veterinary inspector of the Ministry of Agriculture. No details are given as to the method of inspection, but it is stated that a charge is made upon the industry for such inspection.

ANNUAL STATISTICAL REVIEW OF FISHERIES ISSUED

The commercial catch of fishery products in the United States, based on the most recent surveys, amounted to 4,840,000,000 pounds, valued at nearly $93,000,000 to the fishermen, according to the publication recently issued by the U. S. Bureau of Fisheries

entitled "Fishery Industries of the United States, 1937", by R. H. Fiedler. About 130,000 commercial fishermen were employed in making this catch.

Based on available statistics for 1936, there was a large increase in the catch of fishery products in the United States and Alaska as compared with the previous year. Statistics of the catch were collected for both 1935 and 1936 in the Chesapeake, Pacific and Lake States, and in Alaska, and when considering the combined catch of these sections alone, an increase of 22 percent in the volume and 19 percent in the value of the catch is indicated. While these increases are reflected in each of the four geographic sections and in many species, they are especially important in increased catches of pilchard in California and salmon in Alaska.

The output of canned fishery products in 1936 amounted to 794,707,000 pounds, valued at $94,564,000, representing an increase of 18 percent in volume and 26 percent in value as compared with 1935; the output of fishery byproducts was valued at $34,976,000, representing an increase of 18 percent; and the production of frozen fishery products, excluding packaged fishery products, amounted to 106,680,000 pounds estimated to be valued at $8,700,000. The production of fresh and frozen packaged fish and shellfish as based on the most recent surveys amounted to 202,396,000 pounds, valued at $26,895,000; and cured fish, 116,311,000 pounds valued at $15,616,000. It is estimated that about 680,000,000 pounds of fresh fishery products (excluding packaged fish and shellfish) valued at about $55,000,000 were marketed during 1936. Thus the total marketed value of all fishery products to domestic primary handlers in 1936 was about $236,000,000. Fishery products imported for consumption during 1936 were valued at $41,873,000, while exports were valued at $13,214,000.

In addition to detailed statistics of the domestic fisheries for 1936, the publication presents reviews of the Bureau's fishery technological, economic, and marketing activities during 1937. It may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 25 cents.

SMELT FISHING IN MAINE

The Bureau's agent reports from Sagadahoc County in Maine that it is probable the catch of smelts through the ice has been somewhat larger this winter than a year ago at the same time, with prices about the same. Some sections of the county are reporting daily catches as high as 50 pounds per fisherman, while in other areas low catches of six or seven pounds were reported. Smelts were sold locally in producing areas of the State at from 20 to 25 cents per pound, while shipments to wholesalers were bringing about 8 to 10 cents less.

TOTAL VESSEL LANDINGS INCREASE IN NEW ENGLAND

Landings of fishery products at the ports of Boston and Gloucester, Mass., and Portland, Maine, during 1938 totaled 400,600,000 pounds, valued at $8,957,000 as compared with 387,960,000 pounds, valued at $9,790,000 during the previous year. The principal items landed were haddock, 134,877,000 pounds, valued at $3,318,000; cod, 93,705,000 pounds, valued at $2,020,000; rosefish, 64,704,000 pounds, valued at $786,000; and pollock, 32,246,000 pounds, valued at $414,000.

Boston led the three ports with landings of 318,745,000 pounds, followed by Gloucester with 63,009,000 pounds, and Portland with 18,857,000 pounds. Landings at Gloucester were the largest since 1919, and those at Portland greater than for any year since 1931. Although the landings at Boston were smaller than those for either 1936 or 1937, they were greater than for any year prior to 1936.

In spite of the fact that the landings at the three ports were 12,640,000 pounds greater than those for the previous year, fishermen received $833,000 less for their catch. The average price per pound declined from 2.52 cents in 1937 to 2.24 cents last year. All important species except swordfish declined in value during the year.

NEW ENGLAND HALIBUT LANDINGS DECLINE

Landings of halibut at the ports of Boston and Gloucester, Mass., and Portland, Maine, by fishing vessels during 1938 totaled 1,573,000 pounds. This is the smallest catch landed at these ports during any year on record. Data are available on the landings of halibut at Boston and Gloucester since 1893 and at Portland since 1916. Prior to 1900, landings at Boston and Gloucester frequently exceeded 10,000,000 pounds annually. Since the year 1900, however, landings declined steadily and have seldom exceeded 5,000,000 in spite of the fact that landings at Portland, Maine, have been included in the total since 1916. During the years following 1929, deliveries have failed to exceed 3,000,000 pounds in any year and have frequently totaled less than 2,000,000 pounds.

While Atlantic Coast landings of halibut continue to decline, increased catches have been taken on the Pacific Coast where the fishery is regulated by the International Fisheries Commission. In excess of 48,000,000 pounds of halibut were taken in the North Pacific by United States and Canadian fishermen during each of the past three years, and it is anticipated that the fishery will be maintained at this or an even higher level.

EFFECT OF CURRENTS ON HADDOCK ABUNDANCE

A partial explanation of the fact that in some years few or no young haddock are added to the Georges Bank population as a result of the spawning season is offered in a publication issued by the Bureau of Fisheries early in February.

In 1931 and 1932 the Bureau undertook to chart the spawning grounds of the American haddock on Georges Bank, to trace the drift of the eggs and larvae, to find whether Georges Bank was supplied with young haddock from other breeding grounds, and to learn what effect ocean currents may have on the brood. As a result of this study, it was found that a change in the direction of current drift may result in the destruction of practically an entire brood of fish and that ocean currents may therefore be an important cause of fluctuations in the abundance of haddock. In 1931, for example, the eggs were carried in a clockwise direction around the bank and many were evidently carried northward to Georges Shoals where they were able to settle to the bottom and establish themselves. In 1932, however, the direction of the ocean currents was changed and large numbers of young seem to have been carried off the northern and southern edges of the bank into deep water where it is not believed they could survive.

The Bureau's studies also show that the spawning of haddock on Georges Bank in any year is concentrated in certain definite areas. Any unfavorable happening in these areas--such as a shift in currents toward deep water--therefore affects the survival of a large proportion of the eggs and young. Such wholesale loss from any cause is apparently not replaced by haddock from other grounds, for it was found that during the years covered by the survey Georges Bank received no significant quantity of recruits from other breeding grounds.

Other details of this study are given in the technical publication "Effect of Currents on Distribution and Survival of the Eggs and Larvae of the Haddock on Georges Bank", by Lionel A. Walford. This publication may be obtained, as Bureau of Fisheries Bulletin No. 29, from the Superintendent of Documents, Washington, D. C., for 15 cents.

SEA SCALLOP FISHERY IMPORTANT AT NEW BEDFORD

Once a center in New England's early whaling industry, New Bedford is now the most important port in Massachusetts in the fast-growing sea scallop industry. The production of these mollusks in Massachusetts in 1937 amounted to nearly 400,000 gallons, valued at about $470,000, and it is estimated that the 1938 catch exceeded the 1937 gallonage by 10 percent. New Bedford accounted for about three-fourths of the production. The growing importance of this fishery will be appreciated when it is realized that the catches in Massachusetts amounted to but little more than 100,000 gallons in either 1933 or 1935,

when the first preceding surveys were made by this Bureau, and in the years from 1929 to 1931 inclusive, the catch did not exceed 60,000 gallons annually. The average price of sea scallops to Massachusetts fishermen in 1938 was about $1.12 per gallon, as compared with $1.20 per gallon in the preceding year.

FISHERIES OF RHODE ISLAND IN 1938

Flounders, etc.--Catches by otter-trawl vessels were relatively light in 1938, and the number of vessels using this gear in the Newport area decreased. While the principal species taken by otter trawls in Rhode Island are flounders, with limited catches of cod, there appears to be an increasing tendency for smaller draggers to concentrate their activities on the capture of such species as skates, sea robin, dabs, and eels for use as bait by the lobstermen.

Striped bass.--The commercial yield of striped bass was somewhat less in 1938 than in the preceding year. It will be recalled that this species was unusually abundant in the earlier year and constituted a welcome source of revenue, especially to trap operators, in view of the relative scarcity of some other species.

Lobsters.--The available supply of lobsters was reported to have decreased materially in 1938. It appeared probable that the commercial catch was as much as 50 percent less than in the preceding year. Prices of lobsters also were low, fishermen probably averaging as much as 10 percent less per pound. It further is reported that many fishermen are abandoning lobster fishing to confine their activities to less costly and strenuous fisheries such as trolling for bluefish, mackerel, weakfish, and striped bass.

Oysters.--Narragansett Bay oysters generally were of better quality and supplies somewhat more plentiful than during 1937. It was reported, however, that prices were so low that only a small part of the available supply was marketed.

Soft clams.--While there was a good supply of soft clams in Lower Narragansett Bay in 1938, the closing of certain areas on account of pollution probably resulted in a decrease in the catch during 1938 as compared with the preceding year. Prices were fair and those local supplies which were available found ready sale. In order to augment local supplies for their regular trade, dealers frequently found it necessary to obtain soft clams from Massachusetts.

FISHERIES OF NEW YORK IN 1938

Striped bass.--As in other areas, striped bass were reported to be plentiful. The catch probably increased 50 percent over that in the preceding year. Returns were also good, averaging about 8 or 9 cents per pound to the fishermen during 1938, which was about the same as during 1937. Striped bass averaged considerably larger in 1938 than during the preceding year.

Bluefish.--There was a continued decrease in the catch of bluefish during 1938. Estimates placed this decrease at as much as 50 percent when compared with the preceding year. It was also reported that there were very few snappers or young bluefish in adjacent waters. Several vessels which have been engaged primarily in the taking of bluefish and cod in previous years were laid up due to the scarcity of this fish. As might be expected with the scarcity of bluefish, prices were good, on some occasions reaching as high as 14 cents per pound to the fishermen as compared with about 9 and 10 cents during 1937.

Mackerel.--Mackerel were much more plentiful than during 1937, and catches were being made in the late fall and winter. Supplies of fresh mackerel on the market have no doubt had a retarding effect upon sales of frozen mackerel produced during the summer for the usual winter trade.

Whiting.--The whiting season was good, but prices low. Some whiting were marketed by the fishermen at as little as one-half cent per pound, although the average for the season was probably about 2 cents per pound, which was approximately the same as that of 1937.

Cod.--There was little change in either the fishermen's price or the volume of cod taken in 1938 as compared with the preceding year. As usual, party boats in and around New York landed considerable quantities of cod, which are usually sold at low prices.

Shad.--The 1938 run of shad in the Hudson River was reported to be good, the catch no doubt increasing between 12 and 15 percent over that in the preceding year. The fish, however, were reported to be unusually small and prices low. It was stated that numerous unemployed persons fished for shad during the season, which no doubt partially accounts for the increased catch.

Alewives.--Fishermen report that large quantities of alewives (river herring) were found dead along the upper Hudson. The fishermen attribute this condition to pollution in the river. Alewives are not taken in large quantities commercially, but many are captured and preserved by pickling by people living in the towns along the river. It is estimated that as much as 90 percent of the catch on the Hudson River is pickled for home use.

Other fisheries.--The fisheries of Long Island were in general seriously affected by the September hurricane. Pound netters were especially affected by the hurricane, losing large quantities of gear which were in the water as well as much that was drying on the racks. Only a few of the pound net fishermen replaced their gear after the storm. Oystermen and clammers also suffered greatly. It is estimated that the oyster production in New York during the year will be at least 10 percent under that for 1937.

FISHERIES OF NEW JERSEY IN 1938

Pound nets.--A preliminary survey of the fisheries of New Jersey during 1938 indicates that the yield by pound nets will be considerably less than in the preceding year. This is not only true in the case of squeteagues or sea trout, which is the most important species in quantity taken by this gear, but is equally true of butterfish, bluefish, scup, croakers, and spot. It is reported that bluefish, which usually contribute an important increment to the revenue derived from pound net fishing, decreased drastically, this decrease being estimated to be as high as 95 percent in the northern part of the State. It was reported that during the past few years many of the firms operating pound nets in the State have added retail markets to their loading platforms. This practice has no doubt been a source of considerable additional revenue in view of the extensive summer tourist trade along New Jersey's sea coast.

Purse seines.--It is reported that a decrease in the yield of the catch by purse seines in New Jersey will be reflected for the year 1938. It is interesting to note that during the past few years these seines have frequently been fished at a greater depth than usual, resulting in increased catches of cod, whiting, and other groundfish.

Otter trawls.--A decrease in the number of otter trawl vessels fishing from New Jersey ports was reported during 1938. Catches by this gear consisted chiefly of small croakers, some scup, spot, and squeteagues or sea trout, and a few fluke.

Lines.--The catch by troll and hand lines in New Jersey no doubt decreased during the year. The available supply of bluefish was limited, accounting for a decreased catch of this species which is usually important in the line catch, and sea bass were not only scarce but their capture was effected more frequently by fish pots than by lines as formerly.

Fish pots.--The use of fish pots in New Jersey's fisheries is reported to be increasingly popular in recent years, especially in Cape May County. The gear resembles a lobster pot, except for a slight difference in the construction of the net funnels. The principal species taken by this gear is sea bass and the yield during 1938 was reported to be fairly satisfactory.

Shad.--An increase in the number of shad nets was noted in the Delaware River during 1938, this increase probably amounting to as much as 25 percent. Shad also were more plentiful during the year, the catch being estimated at some 40 to 50 percent more than during 1937. Roe shad were reported to be unusually small, averaging but little heavier

than bucks. Prices to fishermen were stated to be as much as one-fifth less than in the preceding year.

Oysters.--Oysters appeared to be fairly abundant in most of the important producing areas during the year. Low market prices and decreased market demand seemed to have curtailed oyster operations especially during the fall of the year. In the Maurice River area a considerable decrease in the number of shipping firms as compared with previous seasons was observed. There was a good catch of seed oysters on public grounds in the Maurice River district, which decreased the demand for seed from other rivers.

MENHADEN FISHERY SHOWS DECREASED YIELD IN SOUTH ATLANTIC

Menhaden in the South Atlantic section, as well as elsewhere throughout their commercial range on the Atlantic Coast, are used almost solely for reduction into fish meal or scrap, and oil. The catch of this species in the South Atlantic section during 1937 amounted to about 160,000,000 pounds as compared with 230,000,000 pounds in the preceding year. The preliminary observations indicate that the catch in 1938 will not be any larger than that in 1937. Not only were the catches small, but producers were also faced with decreased prices, oil having declined about 10 cents per gallon from the previous year, and meal from three to eight dollars per ton. Decreased catches of menhaden have been the rule not only in the South Atlantic section but elsewhere along the Atlantic Coast.

SHRIMP PRODUCTION DECREASES IN SOUTH ATLANTIC SECTION

The catch of shrimp in this section during 1937 amounted to about 27,400,000 pounds, which is approximately 6,000,000 pounds less than the catch in 1936. This decreased catch was recorded in spite of the fact that there was an increased number of boats engaged in the fishery. Preliminary investigation indicated that the catch in 1938 would be somewhat less than that of 1937. Supplies of shrimp are notably erratic in time of their appearance and in their abundance, which are important contributing factors to frequent and rather widely varying price fluctuations. During the latter part of 1938, prices for shrimp were unusually low, probably due largely to coinciding of the peak season for both east coast and gulf shrimp at this time.

SEATTLE "COD" FLEET RESUMES FISHING

After several months of negotiation between officials of the Fishing Vessel Owners Association and the Seattle Fish Exchange Dealers, an agreement was reached on January 24, which permitted the local halibut fleet to resume the winter fishery for sablefish, "lingcod", and rockfishes on a controlled basis. Plans call for sending out six vessels a week from Seattle to bring in about 60,000 pounds of fish weekly until the halibut season opens. Dealers have agreed to bid a minimum of 6 cents a pound for sablefish and 5 cents per pound for "lingcod" and rockfishes.

The first vessels to leave port after the agreement had been reached departed on January 25, terminating a tie-up of nearly three months.

As a result of the price disagreement, there were no landings by the vessels in the halibut fleet during December or January. In the same months the previous year, landings amounted to 436,000 pounds, valued at $15,000.

STATE OF WASHINGTON ISSUES ANNUAL FISHERIES BULLETIN

The very comprehensive annual report of the Department of Fisheries of the State of Washington was received in the Bureau during the month. It is identified as "Annual Bulletin No. 38". The report includes monthly statistics of the landings of seafoods by spe-

cies in the various commercial producing areas of the State for 1938, and comparative data for preceding years; additional details of the catch and pack of salmon; statistics relating to sport fishing; a comparative statement of the number of licenses issued; and reviews of hatchery, biological, and stream improvement activities conducted by the State Department of Fisheries.

REPRODUCTION OF THE JAPANESE OYSTER

There was received in the Washington office during the month biological report No. 36-E, of the Department of Fisheries, State of Washington, entitled "Preliminary Observations on the Reproduction of the Japanese Common Oyster, Ostrea gigas, in Quilcene Bay, Washington", by Milner B. Schaefer. The report emphasized the rapid increase in the Production of Japanese oysters in the State of Washington since 1931. In that year about 8,000 cases of canned Japanese oysters were packed, while in 1936 the pack had increased to more than 150,000 cases. The industry has essentially been based on the growing of marketable oysters from seed oysters imported from Japan. However, in view of the importance of this new fishery to the Pacific Northwest, the current study was undertaken to determine the possibilities of propagation of Japanese oysters in the State to supply the needs for seed. The study has not been completed due to lack of funds, but it is stated that there promises to be a more or less regular spat fall in Quilcene Bay on Hood Canal. The report includes data on hydrographic observations, spawning and larval developments, and setting.

SAUGER LEADS ON CHICAGO MARKET

A total of 85 fishery products was received in the Chicago Wholesale Fish Market during December, 29 being fresh-water fish, 37 salt-water fish, and 19 shellfish and miscellaneous fishery products. The most important species of fresh-water fish with respect to volume was sauger, with receipts of 430,000 pounds, reflecting an acute increase of 760 percent over November for this variety. Fourteen percent of the receipts of sauger was frozen. Yellow perch was next with 307,000 pounds, an increase of 45 percent in comparison with November receipts.

Halibut, with receipts of 403,000 pounds, indicating an increase of 16 percent over November shipments, was the leading salt-water fish received. It is interesting to note that 65 percent of all receipts for this species during December was imported from British Columbia. Next came rosefish fillets with 188,000 pounds, an increase of 41 percent. Shrimp, with carload shipments arriving principally from Louisiana, was the leading shellfish with 396,000 pounds, representing a decrease of 7 percent in comparison with November receipts. Following shrimp were shucked oysters with 155,000 pounds, an increase of 21 percent.

CHICAGO FISH RECEIPTS INCREASE

During December fishery products reaching the Chicago Wholesale Fish Market totaled 3,891,000 pounds, which is an increase of 13 percent over receipts in the preceding month. Of the entire receipts, 1,230,000 pounds, or approximately 32 percent, had their source in eight Provinces of Canada. These imports, consisting largely of sauger, halibut, and yellow pike, represent an increase of 692,000 pounds or 129 percent over receipts for November. The most important single Province, in total poundage, contributing to the Chicago Market during the month was Manitoba with 760,000 pounds, composed principally of sauger and yellow pike. The leading State in furnishing Chicago with fish during the month was Michigan with 390,000 pounds, made up largely of lake trout and whitefish. Following closely, however, were Illinois with large shipments of yellow perch, and Wisconsin with important shipments of lake trout.

Rail freight was the leading carrier in transporting fishery commodities to the Chicago Wholesale Market during December, the total carried by this means during the month amounting to 1,929,000 pounds or approximately 49 percent of the total receipts. Motortrucks conveyed 31 percent and express 20 percent of the total.

MARINE-ANIMAL OIL PRODUCTION DECLINES

During 1938 approximately 33,000,000 gallons of fish and marine-animal oils were produced by United States firms, according to preliminary data collected by the Bureau of Fisheries. This is approximately 2,500,000 gallons less than the production in 1937 and 7,000,000 gallons less than in 1936 when the record production of nearly 40,000,000 gallons was obtained.

Pilchard oil was the largest single item produced during the year. The yield of this oil amounted to over 16,000,000 gallons or nearly one-half of the entire production. Following in importance were whale and sperm oil, 7,800,000 gallons; herring oil, 4,000,000 gallons; and menhaden oil, 3,500,000 gallons.

As most of the pilchard oil was produced at plants located in the vicinity of San Francisco, Monterey, San Pedro, and San Diego, California, that State led all other areas in the production of oils from marine products. The second most important producing area for the manufacture of these oils was in the Southern Hemisphere where factory ships operating from New York have produced large quantities of whale oil during the past three years. During 1938 two factory ships, which operated off Australia and in the Antarctic, produced 7,250,000 gallons of whale oil. This is approximately 1,000,000 gallons less than the production in this area during 1937, but over twice the amount obtained in 1936, the first year that modern United States factory ships engaged in whaling.

QUARTERLY MARINE-ANIMAL OIL TRADE

Shortly after the end of each quarter of the year, the Bureau of the Census issues a preliminary report on the domestic production and consumption of fats and oils, and on the stocks on hand at the end of the quarter. Among the items included in the report are data on marine-animal oils.

There is listed below the information on these oils contained in the report dated February 1, which is for the three months ending December 31, 1938. (Copies of the report can be obtained from the Bureau of the Census, Washington, D. C.)

Production, Consumption, and Stocks of Marine-animal Oils

Oil	Factory operation for the quarter ending December 31		Factory and warehouse stocks, December 31
	Production	Consumption	
1938	Pounds	Pounds	Pounds
Cod and cod-liver oils	1,025,411	5,062,775	31,135,132
Other fish oils	1/ 88,215,956	54,204,806	142,966,541
Whale oils	12,951,833	12,396,238	82,250,583
Total	102,193,200	71,663,819	256,352,256
1937			
Cod and cod-liver oils	1,083,615	3,400,888	18,148,840
Other fish oils	2/ 71,914,630	46,219,801	106,380,866
Whale oils	16,374,361	11,117,272	76,084,404
Total	89,372,606	60,737,961	200,614,110

1/ Includes herring and sardine oils, 77,300,963 pounds; menhaden oil, 9,913,299 pounds; and miscellaneous fish oils, 1,001,694.

2/ Includes herring and sardine oils, 62,31[illegible]65 pounds; menhaden oil, 8,735,619 pounds; and miscellaneous fish oils, 859,576 pounds.

Marine-animal Oils Imported for Consumption

Oil	4th Quarter 1938	4th Quarter 1937
	Pounds	Pounds
Whale oil	7,719,008	1,664,910
Cod oil	5,099,273	3,794,468
Cod-liver oil	13,732,395	10,997,220
Other fish oil	134,377	108,758
Total	26,685,053	16,565,356

Note:--Oils "Entered for Warehouse" and not yet withdrawn are not included. During the 4th quarter of 1938, exports of domestic fish oils totaled 327,729 pounds as compared with 336,659 pounds during the same period in 1937.

FROZEN FISH TRADE

Domestic Stocks of Frozen Fish Decline

Cold storage holdings of frozen fishery products totaled 77,003,000 pounds on January 15, a decline of 13,675,000 pounds as compared with the previous month. Whereas stocks of frozen fish on December 15 were nearly 11,000,000 pounds greater than the holdings on the same date the previous year, those on January 15 were but 3,900,000 pounds greater than the stocks in storage on January 15, 1938. Important items held in considerably greater quantities than a year ago were halibut, mackerel, salmon, whitefish, and whiting. Decreased holdings were reported for cod, haddock, and rosefish fillets, and swordfish.

Holdings in the New England and Middle Atlantic sections were less than those on the same date last year, while the holdings in all other sections increased.

During the month ended January 15, 6,747,000 pounds of fishery products were frozen as compared with 9,207,000 pounds during the same period last year. The principal items frozen during the month were pollock and rosefish fillets, mackerel, whiting, and shrimp.

Freezings of butterfish, mackerel, blue pike, fall salmon, smelts, and whitefish during the month ended January 15 were greater than during the same period last year, while those of haddock, pollock and rosefish fillets, bluefish, and swordfish were considerably smaller.

Fillets Important in Boston Cold Storage Holdings

The importance of the rapidly expanding filleting industry to Boston and the New England fishery interests is apparent from an inspection of the fishery cold storage holdings at that port for January 25. Of the entire Boston freezer holdings of fish on that date, 7,070,000 pounds or approximately 56 percent consisted of fillets. In volume, the principal fillets frozen were pollock and haddock respectively. Other fillets frozen in considerable quantities were cod and rosefish.

The Boston freezer holdings of fish and shellfish combined amounted to 13,563,000 pounds on the last Wednesday in January, representing a decline of almost 19 percent when compared with December figures. These holdings consisted of 29 varieties of salt-water fish, 3 fresh-water, and 3 shellfish. Of all species in storage, the largest individual item was pollock fillets with 2,721,000 pounds. However, when compared with December holdings, this species decreased 23 percent. The holdings of rosefish fillets, smelt, and swordfish (Japanese) were considerably larger than a month ago.

Cold Storage Holdings in New York City Down

On the last Thursday in January, cold storage holdings of fishery products at New York City totaled 8,758,000 pounds, representing a decline of 485,000 pounds or 6 percent in comparison with December. This decrease was due primarily to heavy withdrawals of scallops, halibut, and mackerel during the month. The freezer figures show that the holdings consisted of 38 varieties of salt-water fish, 14 of fresh-water fish, and 8 species of shellfish and miscellaneous fishery items. Shrimp was the principal species in storage, the holdings amounting to 1,430,000 pounds. Sturgeon and salmon followed in order with 912,000 pounds and 687,000 pounds respectively. The holdings of whitefish, smelt, and swordfish (Japanese) were increased considerably during the month.

Shrimp is Leading Species in Chicago Freezers

Frozen shrimp continued as the principal fishery commodity in Chicago freezers during January. On the last Thursday of that month freezer holdings at this important lake market indicated a total of 999,000 pounds of this crustacean in storage; however, this represented a decrease in holdings of 219,000 pounds or 18 percent in comparison with December figures.

In addition to shrimp, Chicago freezers stored 51 other fishery items, 18 being fresh-water fish, 29 salt-water, and 4 shellfish. The total Chicago holdings as of January 26 amounted to 5,981,000 pounds, a decrease of 252,000 pounds or 4 percent in comparison with December holdings. Other species showing considerable decreases for this period were chubs, lake herring, and lake trout. Items having considerable increases were blue pike, sauger, and red snappers.

CANNED FISH TRADE

Canned Salmon Stocks Down

According to information released by the Association of Pacific Fisheries, unsold stocks of canned salmon on December 31, 1938, amounted to 2,769,000 cases of 48 one-pound cans. This is a decrease of 3 percent as compared with unsold stocks at the end of the preceding month; a decrease of 31 percent as compared with December 31, 1937; and 13 percent as compared with the five-year average of stocks on December 31. Alaska reds contributed 1,272,000 cases or 46 percent to the total stocks, and pinks, 1,029,000 cases or 37 percent; chums accounted for 7 percent; cohoes, silvers, and medium reds combined accounted for 5 percent; and chinooks, Puget Sound sockeyes, bluebacks, and steelheads, the remaining 5 percent.

Maine Sardine Stocks Show Little Change

Stocks of Maine sardines in the hands of packers did not change materially during January from the estimated figure of 50,000 cases on January 1, according to information submitted by the Maine Sardine Packers' Association. This has been due to the limited movement of sardines during the holiday season extending into the first part of January and to the hesitancy on the part of packers to fill extensive orders later in the month until after the Food Trades Conference which was held in Chicago during the last week of January. Packers' prices for cases of one hundred cans each, f.o.b. Maine, are generally as follows: Keyless, 1/4 pound, in oil or mustard, $4.00 to $4.25 per case; key, decorated, 1/4 pound, in oil, $4.50 to $4.75 per case; and key, cartoned, 1/4 pound, in oil or mustard, $5.00 to $5.15 per case.

California Sardine Pack Decreases in December

At the end of December the pack of sardines in California for the season beginning in August 1938 aggregated 1,431,000 standard cases of 48 one-pound cans, as compared with

1,358,000 cases during the same period the previous year, according to data issued by the Division of Fish and Game of the State of California. It is interesting to observe that there is yet an increase in the season's pack in spite of the fact that the pack during December was more than 150,000 cases short of the pack in December 1937.

California Mackerel Pack Nearly Million Cases

According to preliminary figures released by the Division of Fish and Game of the State of California, the pack of canned mackerel during the calendar year 1938 amounted to 947,000 cases of 48 one-pound cans. The pack of mackerel in the United States is produced principally in California although some quantities are canned in New England. The entire pack of canned mackerel in 1937 amounted to 841,000 cases. The mackerel canning industry in California is centered almost entirely in the San Pedro district where 94 percent of the 1938 pack was produced. Smaller quantities were produced in the San Diego and Monterey districts.

California Canned Tuna Pack Under Previous Year

The pack of canned tuna and tunalike fishes in California during the calendar year 1938 amounted to about 2,650,000 cases of 48 half-pound cans, according to preliminary data prepared by California's Division of Fish and Game. This represents a decrease of about 16 percent as compared with the pack in the preceding year. Of the total pack nearly one-half consisted of yellowfin tuna, most of which was canned in the San Diego district. The other more important varieties in order were: Striped tuna (skip jack), bluefin tuna, albacore, and bonito. The entire pack of these species was produced in the San Pedro and San Diego districts, with the San Diego area contributing 53 percent of the pack.

FOREIGN FISHERY TRADE DECLINES

Trade statistics show that there was a decline of 13 percent in the volume of our foreign trade in edible fishery commodities in 1938 as compared with the previous year. Imports amounted to 302,624,000 pounds as compared with 364,668,000 pounds in 1937, while exports totaled 118,030,000 pounds as compared with 119,068,000 pounds in the previous year. It is interesting to note that 75 percent of our exports consist of canned salmon and sardines, while imports are divided between many products. Chief of these are fresh or frozen fresh-water fish, salmon, halibut, swordfish, smelt, tuna, herring, and lobsters; pickled or salted groundfish and herring; and canned tuna, sardines, crab meat, and clams.

FISHERY TRADE INDICATORS
(Expressed in Thousands of Pounds)

Item	Month	Latest month	Same month a year ago	Previous month
FRESH FISH LANDINGS				
Boston, Mass.	December	22,306	22,878	23,557
Gloucester, Mass.	do	3,639	5,901	6,244
Portland, Me.	do	592	603	1,484
Boston, Gloucester, and Portland:				
Cod	do	6,442	6,299	7,794
Haddock	do	6,840	5,867	7,609
Mackerel	do	1,999	737	443
Pollock	do	5,081	4,996	7,987
Rosefish	do	3,334	8,286	3,940
FISH RECEIPTS, CHICAGO 1/				
Salt-water fish	do	821	(2)	723
Fresh-water fish	do	2,326	(2)	2,101
Shellfish, etc.	do	744	(2)	632
By truck	do	1,192	(2)	1,450
By express	do	771	(2)	1,124
By freight	do	1,929	(2)	882
COLD STORAGE HOLDINGS 3/				
New York, N. Y.:				
Salt-water fish	January	4,188	(2)	4,540
Fresh-water fish	do	2,196	(2)	2,164
Shellfish, etc.	do	2,374	(2)	2,538
Boston, Mass.:				
Salt-water fish	do	12,594	(2)	15,514
Fresh-water fish	do	43	(2)	47
Shellfish, etc.	do	926	(2)	1,170
Chicago, Ill.:				
Salt-water fish	do	1,440	(2)	1,344
Fresh-water fish	do	2,740	(2)	2,674
Shellfish, etc.	do	1,161	(2)	1,377
Unclassified	do	640	(2)	838
United States:				
Haddock fillets	do	4,601	5,194	6,167
Halibut	do	7,234	6,245	9,645
Mackerel	do	4,390	2,957	4,801
Pollock fillets	do	4,280	4,082	4,738
Rosefish fillets	do	1,221	3,729	1,782
Salmon	do	10,860	9,778	13,191
Whitefish	do	1,722	1,224	1,801
Whiting	do	7,457	6,622	8,228
Shrimp	do	5,442	(2)	5,548
New England, all species	do	20,940	22,402	25,600
Middle Atlantic, all species	do	13,930	14,922	14,545
South Atlantic, all species	do	3,499	2,734	4,328
North Central East, all species	do	11,585	9,239	12,692
North Central West, all species	do	4,828	5,350	4,964
South Central, all species	do	2,269	753	2,458
Pacific, all species	do	19,951	17,229	26,092
FOREIGN FISHERY TRADE 4/				
Exports:				
All edible fishery commodities	December	13,512	12,356	13,407
Canned salmon	do	4,789	2,796	4,607
Canned sardines	do	6,009	6,388	5,689
Imports:				
All edible fishery commodities	do	26,789	29,445	32,802
Fresh-water fish and eels, fresh or frozen	do	5,153	5,533	4,318
Canned tuna	do	340	147	492
Canned sardines	do	2,000	2,183	2,524
Cod, haddock, hake, etc., pickled or salted	do	2,125	3,048	6,690
Herring, pickled or salted	do	4,680	4,674	6,402
Crab meat, sauce, and paste	do	242	248	222
Lobsters, not canned	do	1,385	1,585	428
Lobsters, canned	do	76	26	15

1/ Consists of direct receipts of dealers, brokers, and smokers.
2/ Data not available.
3/ Data for individual cities are as of the last Thursday of the month, except those at Boston which are for the last Wednesday of the month, and those for geographical areas and the total of the United States which are as of the 15th of the month.
4/ From data compiled by the Bureau of Foreign and Domestic Commerce.

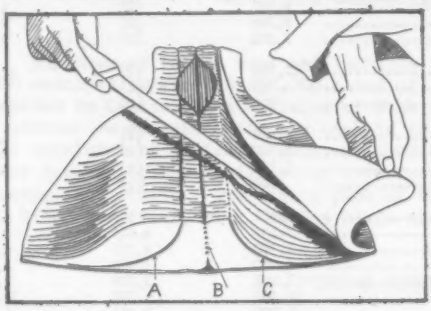
Note.--Data for the latest month are subject to revision.

MARKETING OF SHAD ON THE ATLANTIC COAST

INVESTIGATIONAL REPORT NO. 38

The season for shad has already started in the South Atlantic States. They will be at their peak of abundance in more northern States shortly. Consequently, the Bureau of Fisheries calls to your attention the publication entitled "Marketing of Shad on the Atlantic Coast", by Fred F. Johnson of the Bureau's staff.

The report includes the findings of a consumer survey covering eight cities from Washington, D. C., to Charleston, S. C. This survey dealt not only with shad but fish in general and brought out the following facts, among others, concerning dietary habits of the families surveyed:



Boning shad operation No. 1

1. The average family serves an average of 51 seafood meals at home annually.

2. The average family eats 6 seafood meals at public eating houses each year.

3. The average 2-person family purchases 1.7 pounds of dressed seafood per meal; a 3-person family, 2.2 pounds; a 4-person family, 2.4 pounds; and a 5-person family, 2.8 pounds.

4. Nearly 50 percent of the 2-person families surveyed in Washington, D. C., and Richmond and Newport News, Va., purchase one pound of dressed seafood or less per meal.

5. Nearly 38 percent of the 3-person families surveyed in the same cities purchase one and one-half pounds of dressed seafood or less per meal.

The small size of the average purchases of fish by small families is most significant in view of the fact that 44 percent of this country's families consist of those of two and three persons.


Boning shad operation No. 2

In addition to discussions of the shad fishery and trade in shad products, the report includes tested recipes for preparing shad and shad roe, and describes a method for boning shad, two illustrations of which appear above.

This report may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 10 cents, by requesting Fisheries Investigational Report No. 38.